Optimization of a syngeneic murine model of bone metastasis.

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Public Summary:
Many cancers metastasize to the bones, particularly in cases of breast and prostate cancers. Due to the "vicious cycle" of cancer cells inducing bone resorption, which promotes further tumor growth, they are difficult to treat and may lead to extreme pain. These factors increase the urgency for emerging therapeutics that target bone metastases more specifically and effectively. Animal studies are essential to the development of any therapeutics, but also require robust animal models of human diseases. Robust animal models are often challenging to develop in the case of bone metastasis studies. Previous methods to induce bone metastasis include intracardiac, intravenous, subcutaneous via mammary fat pad, and intraosseous cancer cell injections, but these methods all have limitations. By contrast, the caudal artery route of injection offers more robust bone metastasis, while also resulting in a lower rate of vital organ metastases than that of other routes of tumor implantation. A syngeneic animal model of bone metastasis is necessary in many cancer studies, because it allows the use of immunocompetent animals, which more accurately mimic cancer development observed in immunocompetent humans. Here we present a detailed method to generate robust and easily monitored 4T1-CLL1 syngeneic bone metastases with over 95% occurrence in BALB/c mice, within two weeks. This method can potentially increase consistency between animals in bone cancer metastasis studies and reduce the number of animals needed for studying bone metastases in mice.

Scientific Abstract:
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